



PATENT

Attorney Docket No. MTI-31529

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

In re Application of : Ronald A. Weimer  
Serial No. : 09/935,255  
Filing Date : August 22, 2001  
For : Method of Composite Gate Formation  
Group Art Unit : 2813  
Examiner : CHEN, Jack S. J.  
Confirmation No. : 1208

**CERTIFICATION UNDER 37 CFR 1.8(a) and 1.10**

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J. Chen / C. S. J.

Commissioner for Patents  
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**RESPONSE TO FIFTH REQUIREMENT FOR RESTRICTION**

Sir:

This is in response to the Examiner's Office Action mailed October 7, 2003, in the above-identified patent application.

The Examiner has now withdrawn the second, third and fourth Office Action Restrictions dated November 19, 2002, March 11, 2003, and July 10, 2003, and issued another (fifth) Office Action identifying seven new "patentably distinct species" of the claimed invention.

The Examiner requires that Applicant elect one species from each of the seven identified groups (A-G). Applicant elects the following species, with traverse as follows:

**A-5: Forming the silicon layer using a partial pressure, i.e.,  $10^{-2}$  Torr or less.**

Identification of claims readable thereon: 1-57 and 73-121.

Applicant traverses the requirement for an election of a method of forming the silicon layer.

- 1) Applicant submits that a "specific" partial pressure of  $10^{-2}$  Torr or less includes a "low partial pressure." (See page 2, line 25: "...at a low partial pressure of about  $10^{-2}$  Torr (10 mTorr) or less..."

- 2) In addition, elements A-1 through A-3 (PECVD, LPCVD, RTCVD) are not exclusive of A-4 or A-5 (partial pressure).

**B-5:** Forming a silicon nitride layer using a **remote microwave plasma source**.

Identification of claims readable thereon: 1-26, 28-51, 53-57, 73-110, 112-121

Applicant traverses the requirement for an election of a type of a plasma source.

**C-1:** Silicon as **polysilicon**.

Identification of claims readable thereon: 1-57 and 73-121.

Applicant traverses the requirement for an election of a type of silicon.

Moreover, none of the claims specify the silicon layer as either polysilicon or amorphous silicon.

**D-1:** Gate dielectric as an **oxide**.

Identification of claims readable thereon: 1-57 and 73-121.

Applicant traverses the requirement for an election of a type of gate dielectric material.

Moreover, a gate "oxide" material includes silicon dioxide, tantalum pentoxide, etc.

**E-5:** Silicon source material as silane (**SiH<sub>4</sub>**).

Identification of claims readable thereon: 1-57 and 73-121.

Applicant traverses the requirement for an election of a type of silicon source.

**F-1:** Nitrogen-containing gases as **N<sub>2</sub>**.

Identification of claims readable thereon: 1-57 and 73-121.

Applicant traverses the requirement for an election of a type of nitrogen gas.

**G-1:** Gate stack as **gate oxide/(silicon nitride barrier)/doped polysilicon/WN/W/nitride**.

Identification of claims readable thereon: 1-56, 73-95, and 97-120.

1. First of all, Applicant traverses the requirement for election of a particular gate stack configuration. Claims 1-41, 73-85, and 97-118 are directed to methods of forming a nitride barrier layer or a semiconductor device, and are not limited to forming a gate stack. Claims 42-57, 86-96, and 119-121 are directed to forming a gate electrode.
2. Secondly, a gate stack will include a silicon nitride barrier layer between the gate oxide and the conductive (doped polysilicon) layer. (See, for example, Claim 53: "...to form a silicon nitride barrier layer...")

3. Third, the Examiner has failed to identify a variation of a gate stack as recited in Claims 55, 93, 94, 119:

**(G-3): gate oxide/silicon nitride barrier/conductive layer (doped polysilicon)/nitride**

Identification of claims readable thereon: 1-56, 73-95, and 97-120.

If the Examiner maintains the requirement to elect a species for Group G, Applicant elects the foregoing **G-3** variation of a gate stack, instead of G-1.

4. Finally, G-2 should be corrected to recite:

**(G-2): gate oxide/silicon nitride barrier/doped polysilicon/metal silicide/nitride.**

See point 2, above. The Examiner is also directed to Claims 57, 96, and 121: "forming a metal silicide layer..." (and page 7, line 28 to page 8, line 1).

The following claims are readable on the combination of elected elements:

A-5/B-5/C-1/D-1/E-5/F-1/G-1: Claims 1-26, 28-51, 53-56, 73-95, 97-110, 112-120

A-5/B-5/C-1/D-1/E-5/F-1/G-3: Claims 1-26, 28-51, 53-56, 73-95, 97-110, 112-120

**Generic Claims.** The following claims are generic: 1, 8, 28 and 73.

Applicant respectfully requests reconsideration and withdrawal of the requirement for an election of a single element of seven different species.

Applicant further notes that the election of species is solely to facilitate an examination search, and that Applicant will be entitled to consideration of claims to additional species upon allowance of a generic claim. It is understood that if the claims of the elected species are found allowable over the prior art, the Examiner will expand the search to include other elements within each of the "species" groups — i.e., A-1 through A4, B-1 through B-4, C-2, D-2 through D-5, E-1 through E-4 and E-6 ( $\text{Si}_2\text{H}_6$ ), F-2 through F-4, and G-2 (and G-3 or G-1, depending on whichever is accepted as being elected).

**Extension of Term.** The proceedings herein are for a patent application and the provisions of 37 CFR § 1.136 apply. Applicant believes that no extension of term is required. However, this conditional petition is being made to provide for the possibility that Applicant has inadvertently overlooked the need for a petition for extension of time.

Applicant believes that the claims are in condition for allowance, and notification to that effect is respectfully requested. The Examiner is urged to telephone the undersigned Attorney if any questions should arise or further discussion would expedite the examination of the application.

Respectfully submitted,

  
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Dated: November 5, 2003

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